APPLYING USER EXPERIENCE METHODS ON TV QUIZ SHOWS INTERACTION DESIGN

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ABSTRACT

The participation of the audience in tv quiz shows has traditionally two types of profiles: the contestant and the home viewer. This project has the goal of define the creation a new user profile: the remote contestant, the participant who would interact with a live TV show from different devices as a player.
The main factors that would affect the user in case of developing this kind of product concept have been obtained applying user experience exploration techniques centered on users needs and desires. Using a qualitative strategic design method has been possible to achieve well-defined and subtle information regarding the motivations and the desirable game mechanics for this future user profile.
Tis study shows the requirement achieving and the prototype evaluation created from the needs and motivations detected from potential users. This paper will present the findings and main conclusions of the study as the experience of the users testing this new model of interaction for TV quiz shows.

Keywords: User experience, User Involvement design, Psychology, Co-Reflection, Interaction, Television.

1 INTRODUCTION

Television Game Shows are one of the more traditional genres of audiovisual entertainment. The classical mechanics of questions and answers contests still work today, and continue to motivate the audience to participate [1], either from a television studio or from the couch in their house. CREA project proposes what should be the next evolutionary step for television game shows. There have been attempts to induce the interaction of the viewers from home using a mobile phone or a computer, but the response from users has not been sufficiently representative as to change the concept of the program. The key to define this change lies not only in the improvement of new technologies but in the motivation of users to use them. The focus of this project focuses on how to motivate users to participate in contests televised by new technologies. Starting from this premise, it has been conducted a study focused on the needs and desires of the user to define a new concept of interaction in televised game shows that really encourages the viewer to become involved.

The CREA project was aimed at defining requirements on a non existing product. The hiring company asked the Userlab team for a study regarding how an interactive quiz television show should be. The goal was de definition of a game in which the user can participate remotely through several multimedia devices. The concept to be developed is a hybrid between conventional television quiz contest and a quiz videogame.
To define a compelling game play mechanics and a motivating interaction to the user, a qualitative baseline study was conducted. This study was used to obtain information about the factors that would lead to a satisfactory user experience in a kind of application in which users could not have previous experience.

2 PHASE 1

The main challenge on this study was mainly methodological. Due to the absences of prototype on which apply the tests was difficult to design a test taken into account most of existing usability techniques. Moreover, the project objectives were focused on the definition of a category of product does not yet exist. However the context of the study

was well defined then was not appropriate to apply techniques only based on ethnographic or participant observation, as it was necessary to generate information from a non-natural scenario.

2.1 Methodological Design

The main challenge on this study was mainly methodological. Due to the absences of prototype on which apply the tests was difficult to design a test taken into account most of existing usability techniques. Moreover, the project objectives were focused on the definition of a category of product does not yet exist. However the context of the study was well defined then was not appropriate to apply techniques only based on ethnographic or participant observation, [2] as it was necessary to generate information from a non-natural scenario.
Finally it was decided to devise a method combining various qualitative techniques of user experience that would respond the needs of this project.
In order to define the premises to be implemented on the first prototype was carried out a qualitative study divided in two parts:

- Exploration: The exploration phase aims to define the strengths and weaknesses with the current media platforms to engage the user regarding answer type quizzes.
- Immersion: The immersion phase is designed to extract a definition of the concept of multi-platform interaction game during TV game show broadcasting.

To meet the objectives of both parts of the study specific methods of exploration and definition of user experience were applied to each phase.

2.2 Sample

The sample of users used for the first phase of the project was divided in two different profiles:
- Expert users: an expert user is someone that is familiar with participating in televised game shows.
- Medium Users: is the kind of user that has not a clear willingness to participate in person in televised game shows.

Both user profiles made the same test separately. The number of users was 11 on the expert users group and 10 on the medium users group.

2.3 Exploration Phase

To carry out this phase of the test technique, it has been applied focus BLA:
Bipolar Laddering (BLA) method is defined as a psychological exploration technique, which points out the key factors of the user experience with a concrete product or service[5]. This system allows knowing which concrete characteristics of the product cause users' frustration, confidence or gratitude (between many others). BLA method works on positive and negative poles to define the strengths and weaknesses of the product. Once the element is obtained the laddering technique is going to be applied to define the user experience relevant details. The object of a laddering interview is to uncover how product attributes, usage consequences, and personal values are linked in a person's mind. The characteristics obtained through laddering application will define what specific factors make consider an element as strength or as a weakness. Once the element is been defined, the interviewer ask to the user for a solution of the problem in the case of negative elements or an improvement in the case of positive elements.

2.4 BLA Performing

BLA performing consists in three steps:
1. Elicitation of the elements: The test starts from a blank template for the positive elements (strengths) and another exactly the same for the negative elements (weaknesses). The interviewer will ask the users to mention what aspects of the product they like best or help them in their goals or usual tasks. The elements mentioned need to be summarized in one word or short sentence.
2. Marking of elements: Once the list of positive and negative elements is done, the interviewer will ask the user to score each one from 1 (lowest possible level of satisfaction) to 10 (maximum level of satisfaction).
3. Elements definition: Once the elements have been assessed, the qualitative phase starts. The interviewer reads out the elements of both lists to the user and apply the laddering interviewing technique asking for a justification of each one of the elements (Why is it a positive element? Why this mark?). The answer must be a specific explanation of the concrete characteristics that make the mentioned element a strength or weakness of the product.

To apply the BLA participants were entrust to play a quiz game using four different types of platforms. Before starting the focus group session participants spend 40 minutes playing quiz games using the following platforms:
1. Fixed console (Wii, PS3): The game used was *Buzz*.
2. Nintendo DS: The game used was *Who wants to be a millionaire?*
3. Mobile Phone: The game used was *Trivial Pursuit*.
4. Web of an existing TV Show: The game used was *Bocamoll*. The *Bocamoll* contest is a quiz television

program that aired at the time of testing and had a website with game on line.

2.5 Results of Exploration Phase

The type of data obtained in the exploratory phase were used to identify the strengths and weaknesses of current devices, this technique was used to identify wants and needs to be meaningful for future applications.
The following will show some of the results achieved by applying the method focus BLA (Bipolar laddering) to illustrate the information obtained in this phase of the project.
In the elicitation phase of expert user group the following table of results was obtained.

Table 1. Table of negative elements, web game Bocamoll, expert group.

Negative elements	*Mention*	*Average*
Sometimes does not accept correct answer.	100%	1,00
Inadequate response time.	100%	2,36
If you do not know an answer does not let you skip.	100%	1,09
It does not give the correct answer.	100%	2,18
Some questions are repeated.	100%	2,45

In this case it shows the table of negatives elements obtained with the technique focus BLA. The 5 elements have a mention of 100% which means that is a relevant element to all users. The lowest ranked element was NE1: *Sometimes does not accept correct answer*. Since each element has a subjective justification we can see the reasons for the low valuation of the users.

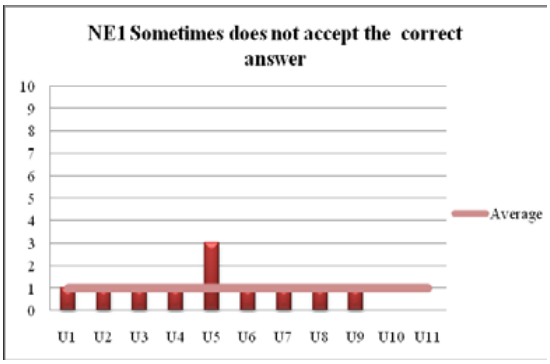


Fig. 1. Scores of negative element 1 (NE1), expert group.

Each of the elements obtained in the table has a subjective justification of the problem and offers a solution generated by the consensus of the group. If there is no consensus, the proposed solutions are registered separately regarding the percentage of users agree to each solution.

Table 2. Table of negative elements on mobile phone gaming, expert group.

Negative elements	*Mention*	*Average*
Screen size	81,82%	2,89
Difficulty using keyboard	54,55%	2,67
Interaction with other players	72,73%	3,50

In case users do not identify the element defined by the group as a problem (or strong point in case of positive elements) will not score such element as it is not relevant for the user.
During the exploration phase were obtained two tables of results, positive and negative elements, for each of the devices tested.
This information allows having a clear idea of the main strengths and weaknesses of each type of interaction with the game. That helps to define a starting point to carry out the new application design.

2.6 Immersion Phase

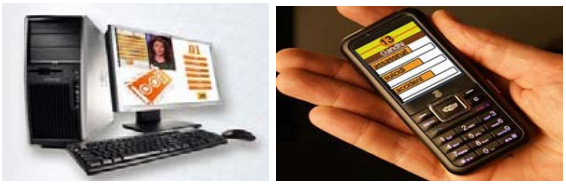
Once defined the main factors that affect the user in major gaming platforms is intended to obtain information about the motivations and game mechanics that should be included in a television contest (quiz) in which the user can remotely participate during the program broadcast.
The immersion phase is designed to extract a definition about desirable's multi-platform

interaction during the TV game show broadcasting. To achieve this goal an exploration technique based on visual elements has designed.
The visual elements, with which users are asked to work, are a series of cards that represent different types of interaction elements to help users define their ideal interaction and game mechanics.
There are four types of cards:
1. Interaction Scenarios: Scenarios are reproduced in which the user can interact remotely, as a living room, bedroom, a sitting on a train or an airport.
2. Devices: Cards that reproduce devices interfaces to real size. The devices are: mobile phone, computer screen, television screen and iPhone.
3. Interface elements: Interface elements will be divided into minimum units and provided with the same size as the devices, so users can repeat the same item with different devices.
4. Blank Cards: All cards/scenarios described above will be mirrored in blank to the same size to allow the user create new items in any category.

Fig. 2. Example of visual cards.

2.7 Immersion Phase

When users receive the artwork start working by groups of 3 or 4 people and defined as they would like to interact with a game of this type. The premise given is the following "*Imagine that while the quiz contest Bocamoll is on air you have the chance of play from your mobile, your laptop or your TV like a videogame. Tell us how you like running a contest of this kind using the visual material you have*".
From this premise users combine the visual elements and proposed the ideal game mechanics. To filter surface information a detailed explanation of each step was requested of each proposal, thus eliminating much of the information that can be unreflective by the user.



Each of these images is composed of several visual elements; users organize those elements to configure a desirable interface depending on the device they use.
Depending on the type of device the interface elements change significantly. For instance on case of mobile phone users opt to remove the television broadcasting due the small interface space they had. This premise was obtained when users realized that due to the large amount of space occupied by the emission interface could not read or interact comfortably with the interactive elements of the game.

2.8 Results of immersion Phase

Immersion phase helped to identify key problems that could have the game concept for each device tested.

Mobile Phone

Interface
The principal condition while designing an interface for game shows for mobile phones is the limited screen size. If the options for interaction and information are not easily identifiable, the application tends to cause rejection.
This factor has been mentioned for both profiles of user's during the exploration phase and has been manifested through the design proposals at the immersion phase.

Interaction Suitable
Prioritize the interactive part. To solve the problem of screen size, it was reached at a consensus solution: you must prioritize the interactive part of the competition in the mobile phone interface. Users do not wish to appear on the mobile interface the TV broadcast. The only reason is the lack of interface area, because when they raised the possibility of interaction with more spacious interfaces (e.g. computer) always have preferred to see both the television broadcast and interactive options simultaneously.

What if the user does not have a television in front? The response from users has been to resolve this situation including optional audio during interaction with the game. In this way the user could play the game using the speech program. Although users were not there to explain, you should consider the

inclusion of visual reinforcement of interface for tests that may be confused just listening to them.

Computer

Interface
The computer is certainly the device that gives users more interaction options. The interface desired by the computer includes the interactive part and the television broadcast at the same time.
The distribution of the screen should be stable and consistent, so that one side always appears the interactive part and on the other side the game show broadcasting.

Interaction Suitable
The problems of interaction that appear on other platforms virtually disappear with the computer. There are two elements that cause this to happen: mouse and keyboard. Both are tools that give the resources to successfully interact with any type of test included in the game show.

Touch PDA or Smart Phone

Interface
The screen size of PDAs, iPhone, Nintendo DS and similar devices is much greater than that of conventional phones. This factor significantly affects the display of the interface and allows that it may be more complex. Users, in cases of interaction with a TV game show, have included items that did not want the mobile phone interface such as punctuation, which would be fixed in a corner or rankings data.

Interaction Suitable
Tactile interaction is the most important distinguishing feature of this type of device. This factor determines the approach of interaction that was defined for mobile phones, since in any case be raised by the use of buttons in response. Tactile devices in the selection of an item screen (how to choose the correct answer) may be pressing on the screen. This advantage presents a comparative offense for users who would play through a buttons mobile phone.

Television
Although the TV does not have a high level of interaction, it has an interface very generous in space, and in this case it can represent both the interactive information (time, position, rank, etc.) and the game show emission.

Interface
Television is the device more intuitive for users because the default is to associate a broadcast TV quiz to it.

In this case the distribution of the interface follows the same model has been proposed with the computer, half the screen to broadcast the program and the other half by the game interaction allowed through the television device is very limited due to the only tool users have is the remote control.
Users are more inclined to navigate with arrows than with numbers, since they considered as more intuitive. Users consider that navigation with numbers was a complicated interaction.

3 PHASE 2

The following describes the study of a prototype design created from the requirements of potential users obtained in the phase 1.
The assessment was raised from the analysis of three user profiles [3]:
- 4 users who have participated in live contest and also have been involved in the first phase of the project; prototype definition.
- 4 users who never have participated in live contest, but also have participated in the first phase of prototype definition.
- 8 potential users who haven't participated in the first phase of the project.

Before starting the test, a pilot study was carried out to evaluate the methodology design. The pilot tests were applied to 4 potential users in order to implement improvements in the final procedure.

Prototype description: The prototype is based on creating a television channel which displays a live quiz contest. Synchronously the following devices are connected: a computer, a mobile phone (touch and by keyboard) and the television itself. Users use the four interfaces in relation to the game show; they play against the rest of the users and also the TV show contestant with real calculation of scores.

3.1 Methodology

The test is divided on three parts:

Introduction: Welcome to the test, description of the prototype explanation of the live contest.
First part: It takes place in a domestic immersion room in which each of the users test each device individually and play together in a live contest with the incentive of win or loses points in real time competing with each other and against the TV contestant [5].
After using each device is given a questionnaire with different items evaluation of their experience to each user [6].

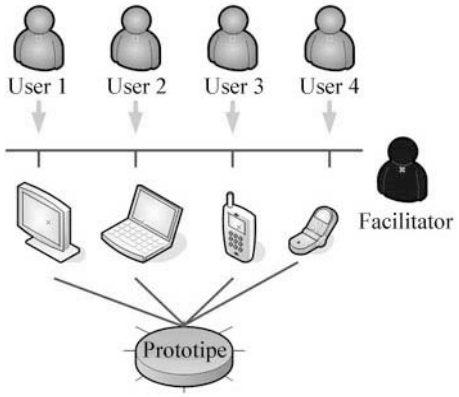


Fig. 1. Development scheme of the first phase. A facilitator manages the session, 4 users test each device individually, competing with each other and to win the user's television.

Second part: Implementation of a BLA interview (Bipolar Laddering) [1] where positive and negative elements of each device are obtained and scored from 1 to 10, justifying each of them individually and collectively [7].

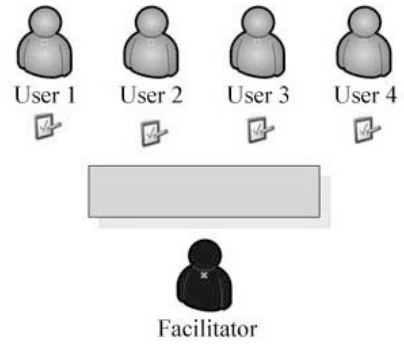


Fig. 2. Development scheme of the second phase. A facilitator manages the session, 4 users participate in the assessment after using the prototype.

3. 2 Test Results

The results shown below show the data obtained in the user experience study about the use of the prototype.

3.2.1 First Part

The results of the questionnaires show quantitatively the immediate perception of the device by user based on the experience they had. Users were asked by the evaluation of different aspects of the interface and their interaction with.

The results are separated between users involved at the definition phase and users who only have participated in the prototype testing phase. The results below show experts participants and inexperienced together since have not been perceived relevant differences between them.

Results: The blue line reflects data from users who participated at the definition phase and the red line which only participated in the evaluation of the prototype.

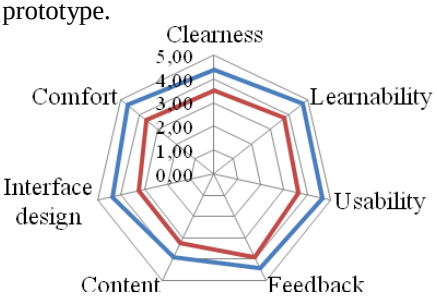


Fig. 3. Evaluation of Television application.

The graph clearly shows that there is little difference between the ratings. The users who have only rated the prototype are those who scored more negatively. Stands out as most valued the feedback from the device and at worst the interface design.

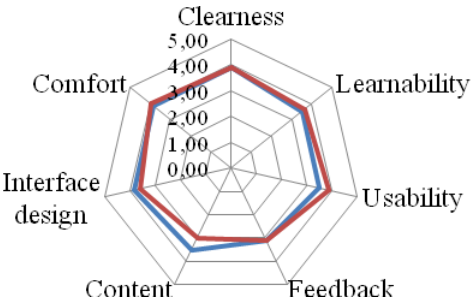


Fig. 4. Evaluation of keyboard mobile application.

The shown graph is clearly similar in both user profiles and the scores are almost the same. The highest rated element is the Usability and the worst score is for the Feedback.

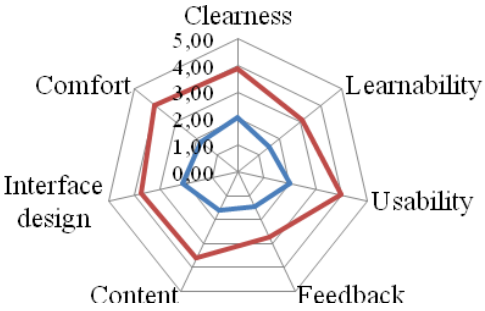


Fig. 5. Evaluation of touch mobile phone.

The graph clearly shows a positive perception for users who have not participated in the prototype requirements phase and clearly negative for users who did participate in defining the prototype. This factor is caused by the difference between the prototype and the expectations expected by users.

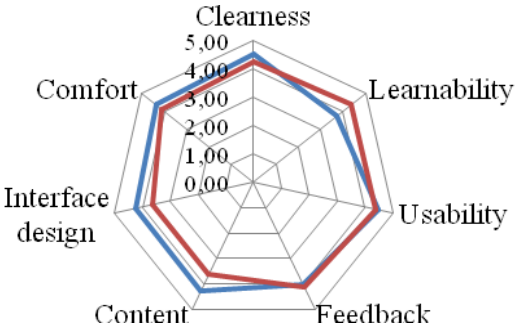


Fig. 6. Evaluation of computer application.

The scores are very similar in both groups only highlighting a difference between learnability, content and interface design.
Data emerging from users who participated at the definition phase and those who have only participated in the assessment of the prototype are very similar for television, keyboard mobile and computer, but have been demanding in the assessment of the mobile device touch.

3.2.2 Second phase

Following are the results of BLA method [2], the most interesting elements are the ones listed below. The data processing has been performed by unifying the results of users that had participated at the first phase and those who only participated in the prototype testing.
In data processing:
- Data is segmented according to the device.
- Results are classified between common positive (strong points) elements, (mentioned by more than one user), particular positive elements (has mentioned only by one user), negative (week points) common elements and negative particular elements.
- Mention index: percentage of users who have mentioned the same element regarding to the total sample.

Tables shown below indicate the common elements for each device.

Table 1. Common positive elements: Television.

Element	Mention index	Average rating
Interface usability	50,00%	8,8
Comfort	18,75%	9
Immersion feeling, realism	56,25%	9
Clearness	18,75%	10
Screen size	12,50%	10
Familiarity	25,00%	8,7
Synchronization with the TV show	12,50%	10

The most frequently mentioned items were the immersion and user interface with an average score of about 9 out of 10. It is precisely the key elements for the user to feel a participant in the contest on an equal footing with television contestant.

Table 2. Negative common elements: Television

Element	Mention index	Average rating
Cannot see part of the screen	25,00%	6,5
Overlapping panels	18,75%	7
Can only play one of the spectators	12,50%	3,5
Lack of information on the keys	31,25%	4,4
Use of the remote control	12,50%	4,5
Accuracy when click (remote)	12,50%	4

The most negative elements have been the lack of information of keys (remote control) and the loss of part of visualization of the contest caused by the inclusion of the application in the bottom of the screen. The given points are easy to fix at a future design of the application and have not relevant average scores.

Table 3. Positive common elements: keyboard mobile application.

Element	Mention index	Average rating
Portable	62,50%	8,4
Screen Size	12,50%	7
Sound included	18,75%	6,6
Ease of use	25,00%	7,7
Ease of response	25,00%	8,2
Clear display	25,00%	8,2
Manageable	12,50%	8

The most important positive element is that it is portable, users can be connected anywhere and anytime.

Table 4. Negative common elements: keyboard mobile application.

Element	Mention index	Average rating
Keyboard	43,75%	3,7
Outdated	31,25%	2,4
Response Time	12,50%	3,5
Interface colors	12,50%	3,5
Mistrust of the service	12,50%	5,5
Age groups of users	12,50%	5,5
Price	18,75%	4
Not displaying the question	12,50%	5
Chronometer	12,50%	3

More detaches negative elements are the use of the keyboard and mobile format, as the key mobile is out of date. Nevertheless, valuations are moderate.

Table 5. Common positive elements: touch mobile phone.

Element	Mention index	Average rating
Ease of use	93,75%	8,6
Portable	37,50%	8,5
Aesthetic clarity, big screen	62,50%	7,5

Among the positive highlights the ease of use as being a touch phone is clearly understand what key you should press to answer questions. The clarity aesthetic is another strong point since it complies with the TV interface.

Table 6. Negative common elements: touch mobile phone.

Element	Mention index	Average rating
Gap with the system	37,50%	0,8
It's complicated with audio only	12,50%	3,5
Keyboard	25,00%	4,7
Mistrust of the service	18,75%	5
Oriented to young users	12,50%	5,5
Expensive service	18,75%	4
Few information about how to play	25,00%	4
Uncomfortable when user have to tap	12,50%	5,5

The most critical negative element is the gap with the system. This element has the highest rate mention and a very negative score. It is clear that if the system lags the user would respond later and user can lose regarding the other players.

Table 7. Positive Common elements: Computer.

Element	Mention index	Average rating
Visibility of the live program	43,75%	9,2
Easy and manageable	75,00%	8,8
Interaction	25,00%	9,5
Screen	25,00%	7,7
Interface	18,75%	8,6
Participatory	12,50%	9,5
Feedback	12,50%	8
Easy to access through the website	12,50%	9,5
Familiarity	12,50%	8

The most positive element of the computer is the ease and manageability of the application. Is a type of fixture clearly known by users with a high willingness to be used.

Table 8. Negative common elements: Computer.

Element	Mention index	Average rating
Availability and delay	31,25%	2,80
Presentation	12,50%	2,50
Synchronization with the program	12,50%	6,50
Lack of information on how to play	18,75%	4,00
Screen Size	12,50%	6,00

The outstanding common negative element is the availability and offset with a very low score. This item also appears in mobile phone applications as in case of mismatch between them would always advantage the contestants would play with the TV application and contest live show participants.

4 CONCLUSIONS

The following points summarize the factors of motivation and acceptance more relevant for the users in case they were able to interact synchronously with a television quiz show

The Live Emission Factor Is Clearly a Motivator

The fact of interacting with a program being broadcast at that time throughout Catalonia is a great motivator for users, in fact this is a basic condition, and so most users will not participate in case the game was not synchronized by the emission.

Is Needed to Use Existing Platforms

Users do not want a new device to play the contest. The implementation of the contest, whatever it is, must be using a device that the user already used previously.

Response Time Factor

One of the principles that have been established for this type of game is that the response time has to score, e.g. the score obtained for both the correct answer as to respond quickly. This score shared between accuracy and time has to be applied in order to avoid the user frustration in short term, removing him right away or giving the impression that it is difficult to win.

Is Needed a Dynamic Interaction

Users do not want to write. This is a premise of interaction that has been almost unanimously, the final application should be quick and easy interactive, if the user has to write, it lows their motivation. This principle is given even by the interaction with the computer, so that is a factor to be considered while designing the final application.

Voice Interaction

The voice interaction seems to be convenient for this type of application. The answer by voice would avoid many problems such as writing, overloading the interface errors or pressing a button. Similarly, although users had the option of voice response also would want the ability to interact digitally, since it is

not always convenient to have to speak loudly to play the contest.
From the user experience and subjective assessments can conclude the following items to be considered for the creation of live contest involving users through multi-devices:
- Television is the main platform to participate at the contest for its familiarity, immersion and naturalness.
- The computer is a secondary platform for participation that would play a major role management, profiling and community.
- The mobile phone is not perceived as a tool for participation, but by its nature can be a supplementary reference tool.
- The customization elements are perceived as motivators. Groups allow users to create units with each other to jointly participate in the contest and promote spontaneous situations to create virtual spaces for competition among different users.

The data obtained in this study may be applicable to any notion of TV quiz show; the willingness of users to play is not related to a particular contest but about how to participate in them.

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